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HOW TO FIGURE LABOR TURNOVER.

BY FREDERICK S. CRUM.

The term *labor turnover* has been variously defined and as its calculation is dependent upon its definition, attention should first be given to just what the term means. So far as I am able to find out from reading an already somewhat extensive literature on the subject, labor turnover was first used and is still most widely used to express the phenomenon of hirings necessary to replace separations in any given industry, establishment or department of an establishment. Before the subject was analyzed too closely, perhaps, by writers of the academic type, labor turnover or the flow of labor in any given industry or establishment, was measured in terms of the average or normal payroll, and it was expressed in the form of percentage of such payroll during the period under observation—usually a week, a month or a year. If the average payroll of a given establishment were 1,000 in a business which required that such payroll be kept at that figure and during a year 500 additions to the payroll were necessary to replace separations therefrom, the yearly labor turnover would be expressed as 50 per cent., or $\frac{500}{1000}$. On an increasing payroll in a growing business the separations from the payroll would still represent the numerator and the average payroll the denominator. On a decreasing payroll in an establishment gradually going out of business, perhaps, or declining from any cause whatsoever, the numerator would be the number hired and the denominator the average payroll, as before. In other words, average payroll by this most generally employed method is always the denominator and the number of employees *replaced* during the period under observation is the numerator in the calculation of *labor turnover*. As this is the older, so, I believe, it is also the best method of measuring labor turnover. Whatever method of calculation is ultimately agreed upon, the statistical problem of *labor turnover* can still be truly stated as Richard B. Gregg has stated it,

namely, as the "measurement of the movement of industrial workers in and out of their employment, and the analysis of its causes and results."

At the National Conference of Employment Managers held in Rochester, N. Y., May 9-11, 1918, a committee was appointed to draft a report which would define labor turnover and state how it should be calculated. The report made by this committee reads as follows:

"Labor turnover for any period consists of the number of separations from service during that period. Separations include all quits, discharges and lay-offs for any reason whatsoever.

"The percentage of labor turnover for any period considered is the ratio of the total number of separations during the period to the average number of employees on the force report during that period. The force report gives the number of men actually working each day as shown by attendance records.

"To compute the percentage of labor turnover for any period, find the total separations for the period considered and divide by the average of the number actually working each day throughout the period."

In brief, this committee advocated the use of attendance force rather than payroll in the calculation of turnover percentages. This seems to have been the main principle advocated in this report, but it is somewhat ambiguous and misleading in some of the statements. For illustration, labor turnover for any period does not necessarily "consist of the number of separations from service during that period." In the current and recent history of shipyard plant construction we find many illustrations of the falsity of this statement. When a shipyard nears completion many of the men engaged for its construction must be laid off from day to day, and these separations do not all represent labor turnover, according to the best and most usual definitions of that term. On a decreasing payroll only the number hired can truly represent replacements or turnover.

The statement that "to compute the percentage of labor turnover for any period, find the total separations for the period considered and divide by the average of the number

actually working each day throughout the period" is to me ambiguous. Probably all that is meant is that the average daily attendance is recommended as the divisor. If so, it does not mean that only those are to be included in the denominator of the fraction who have worked or been in attendance "each day throughout the period." It is conceivable that the turnover in a given year would be represented by infinity in an establishment where no employee could show a record of 100 per cent. attendance. The point in this committee report, however, which challenges discussion is the recommendation that the working force, as shown by attendance records, be made the basis upon which labor turnover is calculated rather than payroll force.

Anyone who has had wide experience in studying comparative labor turnover figures in such an extensive industry as shipbuilding will at once question the validity of this new method apparently advocated by at least some of the employment managers at the National Conference in Rochester, last May (1918). One of the principal objections to it is that attendance is a more fluctuating factor than payroll. On an extremely hot day, 1,000 or more men out of a force of 5,000 might lay off for the one reason "too hot to work." This is not an isolated instance; there are plenty such illustrations in the daily attendance reports of the 160 or more shipyards which it was my privilege to review for a period of eleven months this past year. Heat, cold, blizzard, rain and snow are meteorological conditions which cause wide fluctuations in daily attendance in shipyard and other outdoor employments. Again, an epidemic period such as that we have been experiencing in the shipyards since September, causes most violent fluctuations, daily, weekly and monthly, in the attendance records—much wider variations, quite naturally, than are reflected in the payrolls. In the first week of October, 1918, it was reported that approximately 6,000 out of 19,000 employees of three large shipbuilding plants at Gloucester, N. J., were ill with influenza. Obviously, the resulting temporary low attendance had little or no real relation to labor turnover. Why then, should this attendance factor be used in calculating turnover percentage?

Another objection to the attendance records as a basis for the calculation of labor turnover percentages is that very frequently the separations or quits when recorded are of employees who may not have been in attendance for a day, two days or longer. Theoretically, the payroll is, therefore, a better denominator for the labor-turnover fraction as it always contains the whole labor force, while the attendance force at any given time may range from 100 per cent. of the payroll down to 50 per cent. or even less in severe weather, during an epidemic, obstructed traffic, etc. These latter phenomena, while affecting attendance seriously, may not and often do not affect the payroll or the separations so far as these enter into the labor-force records.

One of the best statements that I have seen advocating payroll in preference to attendance as representing average force for labor turnover calculations is that by Mr. E. Goldberger, efficiency engineer, Packard Motor Car Company, published in the November, 1918, issue of *Industrial Management*. The statement follows:

"The total number of men that have been hired and been paid off, *i. e.*, actually replaced, represents a complete turnover, and if there be an excess of men hired over paid off, they actually are to be accounted to increase in force, while if there be an excess of men paid off, they represent a decrease in force.

"There are more reasons in favor of counting the men on our books rather than those really attending, as some men leave without notice, passing through a transitory stage of not attending and still being on the books, so that, when they leave and are counted in the turnover, they do not represent the turnover of the force working, but of that on our books.

"It is much easier to count the men on the books than those attending, as the first information can be made available quickly in the employment office, while the last one has to be made available by many clerks in different departments or by the time office.

"It is very likely that high wages, where they are unwarranted, will force us to face the problem of absentees, and to study a standard coefficient of attendance. This is, in my

opinion, a good enough reason to keep the same denominator for all three coefficients—labor turnover, labor fluctuation and labor attendance.”

The following quotation* also is in conformity with my own point of view, as regards the method of calculating the labor turnover:

What most persons mean by labor turnover is labor replacement. The term labor turnover arose in connection with discussions of the cost of hiring and firing workers. It was recognized that men drifted in and drifted out of industries. Competent men often did not stay, and incompetent men had to be fired after expensive trial. Effective labor service finds the right man for the right job and then gets him to stick. If he does not stick then someone else has to be hired to take his place, or if a mistake in judgment is made and an unfit person employed, then that person has to be fired and another worker found for his job. This is labor turnover but a better and more accurate phrase is to think of it as necessary *labor replacement*.

The National Employment Managers' conference by deciding that the number of employees actually working each day rather than the number appearing upon the payroll should be the proper base for computing labor turnover introduced another factor into personnel fluctuation. This factor, which may be termed *labor variation*, is something different from either plant change or labor replacement.

The number of the working force actually working on any one day is dependent upon sickness and accident, upon explainable absences, and upon habitual loafing usually after pay day. Increasingly, employment offices are keeping records of these daily absences, seeking for the causes of these constant leaks and endeavoring to stop them. But such absences do not mean usually that a man is fired or even that some one is hired to take his place. This labor variation is not labor turnover as the term is ordinarily used. Yet if the daily working force rather than the payroll sheets are used as the base for figuring labor turnover then this element of temporary absences affects to some degree the percentages.

A report then of personnel fluctuation for any period of time should show in percentages the plant change, the labor replacement and the labor variation. These are three distinct elements in the personnel fluctuation. They are due to different causes, require different remedies and should never be confused.

One other subdivision may be desirable. Persons whose places must be refilled leave for avoidable and unavoidable reasons. Among the unavoidable reasons are marriage, death, ill health, retirement, family leaving city, and military service. It is worth while to divide the leavings under labor replacement into avoidable and unavoidable, making separate percentages.

* From "Standardizing Labor Turnover" by Harry W. Kimball, *Industrial Management*, December, 1918.

The decrease of the avoidable leavings from week to week, and from year to year, is the true measure of the efficiency of the labor service.

While a record should be kept of all transfers from one department to another within the plant, these transfers should not enter into the calculation of any personnel fluctuation as they do not increase or decrease the working force.

The simplest way of calculating these three elements of personnel fluctuations is by the week, and the simplest base to use is the number on the payroll.

Daily attendance records are extremely important and hours-of-work records, also very important for several purposes, should be available to the manager of a plant or establishment, but I seriously doubt their utility in the calculation of labor turnover. Payroll measured against daily attendance gives a reasonable notion of the percentage and total amount of absenteeism. Such ratios could be computed weekly, monthly, quarterly and yearly. In other words, daily attendance should preferably be considered as a coefficient of payroll. Among shipbuilders, for the country as a whole, approximately 85 per cent. of the average payroll was in daily attendance. There were wide variations, however, from this figure when individual yards, different sections of the country and the different seasons of the year were considered.

For a proper measurement of daily attendance good payroll records must be freshly available and, if available, there would appear to be no good reason why labor turnover should not be measured against payroll rather than against attendance—a more widely fluctuating, and at least as regards *labor flow* a more artificial factor than payroll. Perhaps one objection to the use of payroll records is that they sometimes are not cleared frequently enough. This is not a valid objection in labor turnover calculations, for the net gain or loss in the payroll is readily obtained when the number hired and the number of separations are known for a given period. An effort should be made to bring about standard and uniform practice in the keeping of all labor or work-time records, and payroll records unquestionably should be more uniform and accurate than at present. Probably the most generally feasible plan would be to have the payrolls cleared at least twice a month,

preferably, perhaps, on the first and fifteenth of each month. Such payroll figures would, I believe, give an excellent basis from which to calculate labor turnover or replacement percentages, labor fluctuations, and daily attendance. If the payroll were cleared weekly the accuracy of the calculations would, of course, be somewhat greater.

Unless some sound standard as to the factors which shall be used in calculating labor turnover is adopted and applied generally at an early date, there will be created a still greater statistical chaos than already exists. At present not only is there no universally or even generally recognized method of calculating labor turnover, but there is also an "utter lack of any standards in estimating cause, extent and cost of labor turnover."*

An efficient employment manager is probably the first and most important step in any effort to bring about stability in the labor force of an industrial plant. The employment manager can perhaps best demonstrate his efficiency by pointing to the reduction of the labor turnover under scientific as compared with the previous and presumably unscientific "hire and fire" method of foremen. To the employment manager, therefore, it is important that his methods of calculating labor turnover shall be uniform and on a basis that can be defended by sound common sense and logic.

Labor turnover should be measured for the principal departments of any given plant as well as for the plant as a whole. Transfers from one department to another would enter into the labor turnover of the departments affected, but such transfers would not count in the labor turnover of the whole plant. In the United States there is a large amount of interstate migration but these migrants are not added to the statistics of immigrants and emigrants for the United States. The analogy illustrates how transfers should be handled. The labor turnover of the departments of any given plant if summed would show too large a labor turnover for the plant as a whole, provided there had been interdepartmental transfers.

Turnover figures are valuable only as they are used and

*"An Initial Survey of the Problem of Labor Turnover," Confidential Reports Series, Report No. 1, The National Association of Corporation Schools.

understood by the employment manager and by the plant management as an index to the labor conditions. When the labor turnover figures are reduced to simple percentages which always have definite significance, the management will get light upon many problems, the solution of which is necessary to effect a reduction in turnover. As the necessary remedies are applied the labor turnover percentage furnishes an index of the result of the remedies. A few of the many partial solutions of the big problem of turnover are profit-sharing, bonus payments, group insurance, other insurance provision for employees such as disability allowances, pensions, etc., good restaurant facilities, quick promotions for the most capable, careful fitting of the employee to the job, etc.

Mere expression of labor turnover in percentages will never solve the problem, but a simple mathematical statement of its size is likely to persuade the manager that it is important to seek for the causes why men leave in such large numbers. Next, he is apt to study the cost of turnover and, finally, he will be in a position to justify to himself or to the owner of the business that it is better to spend money for preventive measures than for the wasteful and reckless hiring and firing methods so usual in American business. The mathematical formula of labor turnover will thus be transformed into a better understanding of the human element, with the result that the average length of service of the employees will be considerably extended and the labor turnover correspondingly reduced, to the great and mutual advantage of employer and employees.

ILLUSTRATIONS OF LABOR TURNOVER CALCULATIONS.

For an increasing payroll the following example will illustrate the method when payrolls and changes in same are available in weekly reports. Some months will embrace five weeks and others four. Any given week should be included in that month which embraces four or more of its days. When five weeks are included in a given month the turnover percentage for the month must be multiplied by 10.4 to reduce it to a yearly basis, and when only four weeks are included the factor for multiplication is 13.

INCREASING PAYROLL.

Week Ending	Payroll	No. Hired	No. Lost	No. Replaced	Labor Turnover Percentage	
					Weekly	Yearly
Oct. 5, 1918...	2,593	37	15	15	.58	30.1
Oct. 12, 1918...	2,615	42	17	17	.65	33.8
Oct. 19, 1918...	2,640	26	19	19	.72	37.4
Oct. 26, 1918...	2,647	17	20	17	.64	33.4
Nov. 2, 1918...	2,644	22	18	18	.68	35.4
Total	13,139	142	89	89	3.39	35.2
Average Payroll	2,628					

In this example the fundamental data are assumed to be available, week by week, and the establishment is assumed to be a growing one with weekly additions to the force generally larger than the subtractions from all causes whatsoever. In this example the weekly percentages of turnover varied only slightly, or from .58 to .72. Multiplying the weekly turnover percentages by 52 reduces them to a yearly basis. For the month ending November 2 the turnover percentage was 3.39. As the period was really five weeks, or 10.4 part of a year, the turnover percentage reduced to a yearly basis is 3.39 multiplied by 10.4, or 35.2.

In the next example the week ending October 26 is purposely shown as indicating a greater loss than gain in the payroll. The replacements for that week represent the number hired rather than the number lost, or 17 rather than 20. For the five weeks as a whole, however, the number hired are in excess of the separations so in the totals the 20 is included as replacements. When large numbers of industrial establishments are being followed week by week, as is done in the Emergency Fleet Corporation, the weekly turnover percentage is a valuable index of the general trend of this phase of the labor problem. It should also serve a useful purpose in any industrial establishment. The payroll, however, should be cleared weekly, if feasible, and at worst, not less often than every two weeks if the labor turnover is to be calculated with a close approximation to exactness.

DECREASING PAYROLL.

Week Ending	Payroll	No. Hired	No. Lost	No. of Replacements	Turnover Weekly	Percentage Yearly
Oct. 5, 1918...	6,754	70	95	70	1.04	53.9
Oct. 12, 1918...	6,729	47	83	47	.70	36.3
Oct. 19, 1918...	6,693	27	78	27	.40	21.0
Oct. 26, 1918...	6,642	50	45	45	.68	35.2
Nov. 2, 1918...	6,647	39	60	39	.59	30.5
Total.....	33,465	233	361	233	3.48	36.2
Average Payroll	6,693					

In this example the payroll is fairly continuously diminishing. In such instances the number hired rather than the number of separations represent the turnover for only such losses are replaced as are represented by number hired during the period under observation. During the five-weeks period, in the example, obviously the turnover percentage is represented by 233, the number hired, divided by 6,693 the average payroll, or 3.48. The factor 3.48 multiplied by $\frac{5}{2}$, or 10.4, gives 36.2 as the labor turnover percentage, yearly basis.

During the week ending October 26, 50 men were hired as against 45 lost from the payroll. In the calculation of the weekly turnover percentage for that week, the number of replacements must be considered as 45, therefore, and not 50, although the 50 should be used when calculating the turnover for the five-weeks period.

If labor turnover percentages are to be calculated only on a monthly basis, the payroll should preferably be given for the first and fifteenth of the month so as to get as true an average or mean payroll as possible. If this is not feasible the next best thing is the payroll at the beginning and end of each month from which approximate means can be derived for each month by taking the sum of the two numbers and dividing by two.

The simplest formula for labor turnover and one which will serve every practical purpose is as follows:

$$T = \frac{R}{\frac{P_1 + P_2 + P_3 + \dots + P_n}{N}}$$

In this formula:

T = Turnover.

R = Replacements, or number hired to replace losses.

P = Payroll.

N = Number of Payrolls used in striking an average for the period under observation.

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